

The E. A. Goeldi zoological collection in the Natural History Museum Bern: Comments on an inventory

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Abstract

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In 1898–1911 the Natural History Museum Bern (NMBE) received a considerable collection of vertebrates and insects from Brazil. The collection was donated by the Swiss zoologist Emil August Göldi (1859–1917), then director of the Museu Paraense Emílio Goeldi (MPEG) in Belém (Pará, Brazil). Part of the specimens were Goeldi's private collection, the majority was a depository of MPEG in Berne to be kept as a reference collection outside the tropical climate of Pará.

The Goeldi collection in NMBE was recently inventoried. All vertebrate specimens were entered into a computer database; the inventory is available on request. As regards invertebrates, some major insect families are catalogued in computerized form, whereas several hundred coleopterans, orthopterans and heteropterans are still undetermined.

In 1992, the Natural History Museum Bern opened a temporary exhibition on the lives of E. A. Goeldi and J. Huber (fig. 1). In this context an inventory of the sizeable zoological collection of animals from Brazil donated by Goeldi was compiled. The existence of the collection in Berne was largely unnoticed by the scientific community (but see Novaes 1974, Roig-Alsina 1988a, b). The aim of this paper is to attract the attention of specialists to this collection and to encourage its use for scientific studies.

1. Origin of the collection

1.1. Biographical background

The Swiss zoologist Emil August Göldi – or Emílio Augusto Goeldi as he used to write his name in Brazil – was born in the hamlet Schlatt near Nesslau (Switzerland) in 1859 and died in Berne in 1917. A detailed biography revealing more than just his scientific career was compiled by Aerni (1992a and unpubl.). Goeldi received his training as a zoologist at the universities of Leipzig and Je-

na, as a student of Oskar Hertwig and Ernst Haeckel. In 1884 he was appointed curator of vertebrates at the National Museum in Rio de Janeiro. When Dom Pedro II, emperor of Brazil, was overthrown in the revolution of November 1889, Goeldi was dismissed as an adherent to the monarchy. He retired to the estate of his father-in-law, the «Colônia Alpina» located near Therezopolis (Teresópolis) in the Serra dos Órgãos (Organ Mountains, W of Rio de Janeiro). For four years Goeldi studied the local fauna and compiled several works on the fauna of Brazil. In this period the majority of specimens from «Therezopolis – Colônia Alpina» were collected by Goeldi and the Swiss preparator Ludwig (Luiz) Tschümperli who was hired specifically for this job in 1891.

In 1894 Goeldi was appointed director of the Museu Paraense in Belém (formerly Pará) in the State of Pará. Founded in 1866 (or 1871 respectively; see Penha et al. 1986), the museum – after an initial period of prosperity – had deteriorated to a state of almost complete decay by 1890 (Goeldi 1896).

Goeldi invited several scientists and taxidermists to Pará, mainly from Switzerland and Germany. Among them were the botanist Jacques Huber who succeeded Goeldi as director in 1907 (see Aerni 1992b) and the zoologist Gottfried (Godofredo) Hagmann. The museum was soon revived and enlarged by a zoological and botanical garden.

By order of the governor of Pará, the museum undertook an expedition to the Amapá area (Brazilian Guyana) in autumn 1895. This region (today Federal Territory of Amapá) was the object of a territorial contest between France and Brazil (Katzer 1897, Goeldi 1898). The aim of the expedition was to explore the fauna and flora of the area, but also to gather information about the territory claimed by both Brazil and France. The participants were Goeldi himself, three Brazilian staff members (Lieut.-Col. Aureliano Pinto de Lima Guedes, his son Manoel and the keeper of the zoological garden – in that year Manoel Paulo Pereira), the botanist Jacques Huber and the preparator Max Tanner, both from Switzerland. Upon return Goeldi delivered a secret report to the governor and published a detailed description of his adventure (Goeldi 1898).

The contestants finally agreed to appeal to a court of arbitration and chose the Federal Council of Switzerland (i.e. the Swiss government) to judge the case. In autumn of 1898 Goeldi travelled a first time to Berne where he stayed for more than a year in order to act as an expert on Amapá for the arbiters and to gather information for the Brazilian legation under the brilliant diplomat Barão do Rio Branco. A second journey to Switzerland (though not to Berne) followed in 1900. Today Brazilian sources speak openly of his activity as a secret agent: «sua atividade como agente secreto ficou no anonimato por muitas décadas» (Cunha 1983, quoting Lins 1965). In December 1900 the arbitration was pronounced in favour of Brazil and the territory assigned to Brazil (Bundesrat 1900). It was to acknowledge Goeldi's services to the country in this affair as well as his merits as director of the museum that the name of the Museu Paraense was changed into Museu Emilio Goeldi (today Museu Paraense Emílio Goeldi, MPEG) by a governmental decree of 31 December 1900 (see Goeldi 1906).



Fig. 1: View of the Goeldi collection (part) on display in the special exhibition on Goeldi and Huber in Berne, November 1992- March 1993. (Photograph by Lisa Schäublin).

Thereafter Goeldi repeatedly visited Switzerland and its capital Berne (e.g. in 1904 to attend the International Zoological Congress held in this city). At this time the thought of a definite return to Switzerland must have arisen (letter to Studer of 15 April 1902). In 1905 he bought a house in Berne where the family took up residence. In 1907 Goeldi returned permanently to Switzerland, where he soon became a professor of zoology at the University of Berne (see Morgenthaler 1993). At the end of 1911 he was elected to the committee of the Natural History Museum.

1.2. Transfer of the collection to Berne

The documents in the archives of NMBE and in the Burgerbibliothek Bern, especially the letters to Theophil Studer, allow a chronological reconstruction of the formation of the Bernese collection (all documents in German, translation by MG). The published reports of the museum committee are rather confusing, since they do not clearly distinguish between arrival of specimens at the museum and their donation (i.e. their becoming the property of NMBE).

During the first stay Goeldi became acquainted with Theophil Studer, then professor of Zoology at the University of Berne and director of the NMBE zoological department. The records of the museum committee (in the following cited

as «Manual») mention a first donation of specimens (Manual, meeting of 14 December 1898, mammal skins and turtles). The next donation followed in September 1899. Further samples (primate and wild boar skulls, mammal skins, fishes from the Amazon river) were recorded in May and July 1901.

In 1901 Goeldi was corresponding with Studer about depositing part of the MPEG holdings in Switzerland, in order to prevent them from decay in the tropical climate of Pará (letter to Studer, of 20 June 1901). In the same letter Goeldi announced the shipment of «some 1500 lepidopterans, among which 300 sphingids in 25 species...» and explicitly stated that the lepidopterans were «a first remittance to that project of a parallel depository ...». At this time he still intended to donate his private collection to his native canton St. Gallen (letter to Studer of 15 April 1902).

In November 1901, the committee of the Bernese museum discussed the idea of a depository in NMBE and decided to accept the collection under the condition that a contract be signed and that the depository be permanent and irrevocable. The agreement, signed by Goeldi on 1 January 1903 in Rio de Janeiro, was approved by the committee in February 1903 and forwarded to the Council of the Burghers of Berne (the trustees of the museum to the present day).

During the following years several shipments of zoological items were sent to Berne, among them:

1901:

- 6 cases shipped to Basel, one of these intended for Studer (52 mammal skins; letter of 23 May and list of contents by Hagmann).

1902:

- «A third case of insects with another 100 sphingids»; hymenopterans.
- Fossil *Mastodon* teeth from Rio Jurua (upper Amazon), sent by Hagmann.

Goeldi then announced a next shipment of 17 cases (letter of 7 June), which arrived in 1903. It contained:

- Mammal skins and hides. Goeldi had marked some of these as reserved for further study by himself by attaching small wooden blocks to them.
- A large series of skulls and antlers, «my private property and worth 1500 francs ... paid out of my own purse», given as a personal depository.
- A large series of mammal and alligator skulls, his private property.

1903:

- Marine fishes from Rio de Janeiro, sent via G. Boulenger at the British Museum (Natural History) in London (100 species; letter of Boulenger to Studer of 5 May 1903).

1904:

- Items for the ethnography museums in Berne and Basel (Manual: 204).

1905 (or earlier):

- Several fossil fishes (13 specimens) and plants (3 specimens) from the bituminous shales of Taubate, São Paulo, Brazil (Manual: 214).

1906:

- Deer antlers and «birds from the Organ Mountains, determined by count Berlepsch» became property of NMBE (Manual: 235–236).

1907: 18 cases that (according to a customs list of 19 April) contained:

Cases 1–3: mammal and reptile skulls for his own investigations

Case 4: insects

Cases 6–9: bird skins

Cases 11 and 12: mammal skulls

Cases 13–15: anatomical specimens in formalin or alcohol

Case 18: bird skins.

Case 10 with botanical items (spirit specimens of fruit of 24 Amazonian trees) was intended for the «Botanical Museum in Zurich».

In 1908 Goeldi bestowed the complete collection on the museum. Thereupon Studer suggested to appoint Goeldi a consultant honorary member to the committee, in order to express the committee's gratitude (Manual, meeting of 28 October); his proposition was not supported though.

Only few items were added to the collection by Goeldi himself after this time: 1908 several nests of social insects; 1909 an *Amazona* parrot (a pet bird of Mrs. Goeldi); 1909–11 several amphibians and reptiles. The depository of MPEG was enlarged however, even after Goeldi's return to Switzerland. At first the new director J. Huber ensured further shipments to Berne («rich samples of hymenopterans, from Óbidos»). Later on, Adolf Ducke, entomologist at MPEG, shipped insects, mainly hymenopterans, among which were many type specimens (see Obrecht & Huber 1993). The last shipment recorded in the archives arrived between 1909 and 1911 (Steck 1912).

2. Holdings of the Goeldi collection in Berne

2.1. Earlier inventories

Since Goeldi used to give only a rough approximation of the contents of shipments in his letters, it is not possible to assess precisely the number of specimens that ever came to Berne. On the other hand, some specimens were subsequently traded with other museums, forwarded to specialists for determination or otherwise lost.

For the birds – and only for this group – two handwritten, undated lists exist in the NMBE archives. The first, comprising 697 specimens, is on note-paper with the imprint of the Museum Hans von Berlepsch: «Verzeichnis der Vögel von Colonia alpina Therezopolis, Orgelgebirge, Staat Rio de Janeiro (coll. E. A. Göldi)». (Count Hans von Berlepsch had been on a visit at MPEG before 1906 and determined a large part of the bird collection; Snethlage 1908.) The second, on plain paper and in a different handwriting, «Vogelbälge aus der Sammlung des Museu Goeldi, nach Bern abgegeben:», lists 1913 specimens.

The two lists were later assembled into a typewritten directory «Collection Goeldi im Naturhist. Museum Bern. Bestimmung Goeldi-Berlepsch 1906» (3160 specimens) by an unknown person. This directory includes a number of specimens erroneously attributed to the Goeldi collection; they were purchased by NMBE out of the collection of John Gould in 1862 and include species from continents other than South America.

On the other hand, some hummingbirds not previously recognized as Goeldi's could be attributed to this collection based on the unique shape of their labels. Many «Colonia» specimens carry an ornamented collector's label. The same kind of label, with the same handwriting (giving sex and date only) was attached to a series of Trochilidae of unknown origin. The handwriting is Tschümperli's; he never noted the collector's name though, being the only preparator in Goeldi's service at the time. (Further evidence comes from a letter to Tschümperli of 7 March 1891: Goeldi advised him to bring various collecting items from Switzerland to «Colonia Alpina».) – However, the collecting locality of these specimens cannot be inferred with any certainty, since Tschümperli followed Goeldi to Belém in 1894 and used these labels for a short period while employed at the Museu Paraense.

2.2. Actual contents

A thorough revision of the material while preparing the new inventory would have exceeded our capacity. Redetermination of specimens was not feasible because of lack of time and staff trained in taxonomy of the Neotropical fauna. Obvious misidentifications were corrected, but usually only nomenclature was updated. All data for vertebrate specimens were computerized (ORACLE database). Invertebrates, on the other hand, were only quantitatively assessed by orders or families. For some hymenopteran families and the sphingids that were already determined a detailed inventory was entered into the database. Special care was taken to locate type specimens and other specimens that were known to have existed in Berne based on archival evidence.

The actual holdings of the collection are given in table 1. For vertebrates, a distinction is made between the private collection (specimens from Colonia Alpina and Rio de Janeiro) and the depository specimens of MPEG.

The value of the collection, especially the vertebrate part, is diminished by two shortcomings: Firstly, documentation of many specimens is incomplete (no date and/or locality unprecise). Secondly, many individuals (mainly birds and mammals) were kept in captivity (in the Jardim zoologico of MPEG) before they were prepared for the collection; only exceptionally is the original trapping locality of zoo animals recorded on the labels. In some cases the locality «Pará zoo» makes no distinction between specimens that had died in captivity and free-living animals collected in the extended zoo and botanical garden area (e. g. Didelphidae).

2.3. Type specimens

Goeldi himself had printed a list of new species described by him or other MPEG personnel and also of species dedicated to him, which he updated seven times up to 1904 (Goeldi 1898). Like many of his contemporary colleagues he was very keen on assigning taxonomic status to animals unknown to him or deviating from the typical morphology. Many of his new names were later removed into synonymy.

Table 1: Holdings of the E. A. Goeldi collection in NMBE. Specimens from Colonia Alpina and Rio de Janeiro were all Goeldi's private property, whereas most vertebrates of the Pará period and all insects were part of the MPEG depository.

Taxon	Total	Preserved in fluid	Col. Alpina period ¹	Pará period	from captivity ²
Vertebrata:	4 420				
Chondrichthyes	1	1	1	0	–
Osteichthyes	191	190	97	94	–
Amphibia	85	79	67	28	–
Reptilia	192	150	96	96	2
Aves	2 964	0	716	2 248	416
Mammalia	987	85	196	970	269
Insecta:	9 645				
Lepidoptera	3 855				
Coleoptera	3 416				
Hymenoptera	1 436				
Heteroptera	315				
Diptera	311				
Homoptera	144				
Salatoria	104				
Odonata	45				
Blattodea	12				
Phasmodea	5				
Mantodea	2				
Fossils	17				
Total	14 082				

¹ includes specimens from Rio de Janeiro

² includes wild animals collected within the boundary of Pará zoological garden

Another problematic issue is priority: As Goeldi was sometimes taking the mention of a new taxon in a letter or during a lecture as the date of first description, his first publication years are not conform with modern nomenclatural standards. In one case a serious dispute about priority arose between Goeldi and his colleague Hermann von Ihering of the São Paulo museum (see Goeldi 1909).

Pipra caelesti-pileata GOELDI 1905, quoted with different years in Goeldi's publications (1903 in litt. and 1904 respectively), makes a good example: The first year relates to a remark in a letter, the second to the mentioning of the name in «Verzeichnis» (Goeldi 1899, suppl. 1904) and to the presentation of the specimens during a conference in Berne (Int. Zool. Congress); the diagnosis appeared in print in 1905, the year of the actual publication in the proceedings of this Congress (Goeldi 1905a).

Goeldi did not designate holotypes; other specimens of the syntype series are located in MPEG or in European museums. In MPEG however, many specimens from Goeldi's period were lost in the decline of the institution in the years after the collapse of the rubber boom (W. L. Overal, in litt.).

Vertebrate Goeldi type specimens in NMBE

The following list gives a brief account of the vertebrate types now in NMBE; for insect type specimens see Obrecht & Huber (1993).

MAMMALIA

Rodentia, Echimyidae

Proechimys goeldii THOMAS 1905

1 o?, Santarem, Baras de Tapajoz, 28 Aug 1903 (mount and skull, NMBE 1003988, colours faded because of exposure to sunlight); 1 ♂, Santarem, Prezenta, 16 Feb 1904 (skin, NMBE 1003989).

Rodentia, Cricetidae

Holochilus nanus THOMAS 1897

= Synonym of ***Holochilus brasiliensis*** (DESMAREST 1819)

1 ♀, no locality, 4 April 1893 (skin and skull, NMBE 1003813).

Artiodactyla, Cervidae

Odocoileus dickii GOELDI 1912

= Synonym of ***Ozotoceros bezoarticus*** (LINNAEUS 1758)

Argentina, northern part of Sta. Fé province; 1906 (antler on partial skull, holotype; NMBE 1001902). The trophy was given to Goeldi when he already lived in Berne; no connection with specimens from Brazil.

AVES

Piciformes, Galbulidae

Galbalcyrhynchus purusianus GOELDI 1905

Syntype series: 13 individuals collected on Rio Purús (see Snethlage 1908: 20).

5 skins, 2 mounts (NMBE 1005003–08).

1 o?, Rio Purús, Monte Verde, 18 Feb 1904; 1 ♂, 1 o? juv., Rio Purús, Bom Lugar, 7 March 1904 and Aug 1903; 1 ♀, Rio Purús, Ponto Alegre, April 1904; 1 o?, Rio Purús, 1904; 1 ♂, 1 ♀, Rio Purús, 1904 (both mounts).

The new name appears for the first time in print in supplement 4 (February 1904) to Goeldi's «Verzeichnis» (Goeldi 1899).

Passeriformes, Pipridae

Pipra caelesti-pileata GOELDI 1905

= ***Pipra coronata caelestipileata*** GOELDI 1905

(Syntype series: 2 ♂, 1 WW).

1 ♂ Rio Purús, Cachoeira do Ubi, 19 April 1903 (skin, NMBE 1006262; red sticker «Holotype» on label).

The new name appears for the first time in print in supplement 4 (February 1904) to Goeldi's «Verzeichnis» (Goeldi 1899).

***Pipra fasciicauda purusiana* SNETHLAGE 1907**

4 skins, paratypes (type series 15 specimens; Snethlage 1908: 12).

1 ♂, Rio Purús, Ponto Alegre (= type locality), 4 April 1904 (NMBE 1 006279); 2 ♂ Rio Purús, Monte Verde, April 1904 (NMBE 1 006280 and 1 006282); 1 ♂ Rio Purús, Bom Lugar, May 1904, (NMBE 1 006281).

Snethlage (1907) describes one male, but gives no information about the number of specimens used for description; total sample size was 15 (Snethlage 1908). The «type» (= holotype?) is given with an MPEG catalogue number.

REPTILIA

Colubridae, Boiginae

Oxybelis goeldii

1 specimen Pará, no date. Nomen nudum? («label name»).

AMPHIBIA

Hylidae

***Hyla resinifictrix* GOELDI 1907**

= ***Phrynohyas resinifictrix* (GOELDI 1907)**

1 specimen Amazon River, no date; NMBE 1 008614, labeled «cotype» (other type specimens in London).

Leptodactylidae

***Elosia lateristrigata* BAUMANN 1912**

= ***Hylodes lateristrigatus* (BAUMANN 1912)**

7 specimens, Organ Mountains, 1892 (NMBE 1 008361–67) (syntypes in Munich).

***Hylodes goeldii* BAUMANN 1912**

= ***Megaelosia goeldii* (BAUMANN 1912)**

1 specimen, Organ Mountains, no date (NMBE 1 008368).

OSTEICHTHYES

Siluriformes

***Phreatobius cisternarum* GOELDI 1905**

2 syntypes from Marajó, 1903, «2 specimens, a smaller and a larger»; presented in Berne at Int. Zool. Congr. 1904, published 1905. Arrival in NMBE recorded in Manual (p. 202); specimens missing today.

Siluriformes, Pimelodidae

***Piratinga pira-aiba* GOELDI 1898**

1, River Amazon, Pará, 1898 (mount of head; NMBE 1 008410).

Perciformes, Pristipomatidae

Diagramma goeldii BOULENGER 1897

1, River Amazon, Pará, no date (NMBE 1 008914).

Perciformes, Haemulidae

Mylacrodon goeldii REGAN 1903

1, Bay of Rio de Janeiro, no date (NMBE 1 008923), (other type specimens in London).

Scorpaeniformes, Triglidae

Peristedion altipinnis REGAN 1903

1, Bay of Rio de Janeiro, no date, (NMBE 1 008944), (other type specimens in London).

Ophidiiformes, Ophidiidae

Genypterus brasiliensis REGAN 1903

2 specimens, Bay of Rio de Janeiro, no date, (NMBE 1 009228–29), (other type specimens in London).

2.4. Other noteworthy specimens

During his years at MPEG Goeldi published a series of articles on rare, rediscovered or otherwise remarkable species (for a list see Goeldi 1905 b). Many of these specimens are today located in the NMBE collection, among them a lungfish *Lepidosiren* (see Goeldi 1896b), a weasel (*Putorius paraensis*, see Goeldi 1897), all specimens of *Dinomys branickii* mentioned by Goeldi (1904), and a mount of *Amazona ochrocephala xantholaema* BERLEPSCH, the third museum specimen worldwide of this subspecies (according to Forshaw & Cooper 1973: 542 only two skins in Senckenberg Museum Frankfurt; Güntert in prep.).

2.5. Missing specimens

Insect specimens from Brazil were usually sent for determination to specialists all over Europe who – in accordance with Goeldi's intention – kept a few specimens in their own institution. In one case the loss of a large number of orthopterans may be due to this procedure: The specimens had been sent to Karl Brunner von Wattenwyl (a citizen of Berne living in Vienna) who later declared himself unable to determine them. He was asked by Goeldi to return them to Berne, but he disregarded the instruction.

Exchange of specimens with some other museums is recorded (Manual: 216): In 1905 skins of sloths (Dasypodidae) and other mammals were traded with the museums of Fribourg and Geneva. A few specimens recorded in the file cards prepared by R. von Fischer around 1960–65 (Lüps 1987) could no longer be located.

Other losses occurred among fluid specimens: a glass with aviculariid spiders

(Manual: 171) and a peripatid («a probably new species of *Peripatus*»; Studer 1907: 14), and – probably the most deplorable loss – two type specimens of the blind siluriform fish *Phreatobius cisternarum* GOELDI. – It seems symptomatic that in the years after 1930 when the museum concentrated on exhibitions less «showy» specimens in fluid were regarded as of minor value and therefore treated less carefully by the curators.

Some mounted birds and mammals damaged by extended exposure to daylight or otherwise in bad condition were «eliminated», among them a manatee and, after 1970, a Razor-billed Curassow (*Mitu mitu* – today extinct in the wild; Sick 1993).

2.6. Collectors and preparators

A considerable number of MPEG staff contributed as collectors and/or preparators to the collection. The names of bird collectors mentioned in Rounds (1989: 85–86) are far from complete (and some other biographical statements inaccurate); it is not clear from what source the number of items contributed to the collection was taken and whether any of the specimens that are now in Berne are included in these numbers.

It may therefore be appropriate to list the names of those collectors that appear on the labels (number of specimens in parenthesis). Some of them are mentioned in the MPEG staff lists in the annual reports (relatorios, published in Boletim do Museu Paraense 1896 and later) and in Snethlage (1914). Astonishingly, collectors' names appear only on labels of avian specimens, not on those of mammals.

Ludwig Tschümperli (complete Colonia Alpina sample; name not mentioned on labels); Max Tanner (preparator during the Amapá journey; name not mentioned on labels); Aureliano Guedes (61), «Guedes» without initial might also refer to his son Manoel Pinto de Lima Guedes, botanical preparator (= M. P.?, only once in 1898); Hermann Meerwarth (157); Gottfried Hagmann (89); Emilie Snethlage (129); Joseph Schönmann (63); Ernst Lohse (30); João Baptista de Sá (73); Manoel Baena (53); A. Costa (52); Francisco Pereira da Silva (15); Oscar Rodrigues Martins (21); Rodolpho Siqueira Rodrigues (17); Francisco Baptista do Carmo (16); C. Miranda (11); Gregorio J. Cerqueira (12); J. Anthero (7); Gustav Küsthardt (3).

The majority of specimens shipped to Berne were study skins or skeletons. One exception are an unknown number of mounted birds and mammals from the Organ Mountains (Studer 1907: 13); the mounts must be the work of L. Tschümperli who was trained as a taxidermist. – With Goeldi's permission a considerable number of animals (mammals, birds, reptiles) were mounted for display in Berne by the preparators H. Grimm (until 1912) and Max Inriger (1912–1922).

3. Goeldi items in other museums in Switzerland

From his earliest time in Brazil Goeldi had provided Swiss naturalists or scientific institutions with zoological, botanical, and ethnographic items. At first the re-

ipients were old friends (e.g. biology teachers) from his time in St. Gallen and Schaffhausen. Later specimens were conferred upon specialists at Swiss universities (Auguste Forel and Arnold Lang in Zurich) and at other European museums (Vienna, Munich, Giessen, London, Tring). To our knowledge the following Swiss institutions received donations from Goeldi or other persons connected with MPEG:

Naturmuseum St. Gallen:

According to the annals of the «Naturforschende Gesellschaft» Goeldi and his collaborator G. Hagmann donated vertebrate and insect specimens to the society, then under the presidency of Goeldi's friend Dr. Wartmann. – Today a few birds and mammals; the majority of the specimens are lost or can no longer be attributed to Goeldi with certainty (Dr. H. Heierli, Silvia Weber, in litt.).

Naturmuseum Schaffhausen:

The collection was destroyed in the 1944 bombing by Allied Forces during World War II.

Eidgenössische Technische Hochschule Zürich (ETHZ), formerly Polytechnikum:

Zoological specimens were probably given to the «Vereinigte naturwissenschaftliche Sammlungen beider Hochschulen». (Goeldi was acquainted with two of the curators – Otto Stoll, one of the experts in the Amapá arbitration (A. Aerni, unpubl.), and Arnold Lang, like Goeldi a student of Haeckel in Jena). The combined collections of the Polytechnikum and the University of Zurich were divided again in 1908; the majority of the vertebrate specimens were assigned to the new Zoological Museum, whereas the entomological collection became the property of ETHZ (Guyer 1974).

The vertebrate specimens (mainly mammalian skulls, see below) remaining in ETHZ after the division of the collection were later forwarded to the Paleontology Museum and the Anthropological Institute, both of University of Zurich (Prof. Dr. R. Camenzind, in litt.).

As regards the botanical items (e.g. palm fruit, plant seeds and tropical wood samples given in 1904, botanical specimens mentioned in a letter of 19 April 1907), they are either lost or were later forwarded to the Institute of Systematic Botany (see below).

Anthropologisches Institut und Museum, Universität Zürich:

232 primate skulls, including the holotype of *Callimico goeldii* (THOMAS); received from ETHZ in 1978 (Dr. P. Schmid, in litt.).

Paläontologisches Museum der Universität Zürich:

Skulls of a variety of mammalian orders, received from ETHZ (Prof. Dr. H. Rieber, in litt.).

Zoologisches Museum der Universität Zürich:

A few mammals only (<10), some from ETHZ (Dr. C. Claude, in litt.).

Naturhistorisches Museum Basel:

Goeldi donated some live animals to the Zoological Garden Basel. Hagmann, son of the zoo director and responsible for the zoological garden in Pará, also sent several live animals (e.g. tapirs) to Basel. Some of these mammals, birds and reptiles came to the museum after their death (Dr. Raffael Winkler, in litt.).

Muséum d'Histoire naturelle, Genève:

14 mammal skins, exchange with NMBE in 1905, catalogued (Dr. F. J. Baud, in litt.).

Institut für Systematische Botanik, Universität Zürich:

The botanical collection (herbarium) of ETHZ was moved to the Botanical Institute a few years ago. Goeldi's botanical specimens – if any of them still exist – are not catalogued (Prof. Dr. K. U. Kramer, in litt.).

Conservatoire et Jardins Botaniques de Genève:

Goeldi mentions a plan of a similar depository of botanical specimens in Geneva, and that the first steps to implement it were already taken (letter to Studer of 15 April 1902). It is not known to what an extent the plan was realized.

An unknown number of herbarium specimens (including several types) sent by Jacques Huber before 1905 are not catalogued (H. M. Burdet, in litt.). Huber is known to have studied some of these during his 1905 visit to Switzerland (Aerni 1992b).

Bernisches Historisches Museum (Berne), ethnography department:

Amazonian Indian weapons (Dr. E. J. Kläy, pers. comm.).

Museum für Völkerkunde, Basel:

Amazonian Indian weapons, (see SEG/SSE 1979).

4. Acknowledgements

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Mr. Werner Ruch-Beck (Biel) and Mr. Ludwig Karl Tschümperli of Lausanne (son of Goeldi's preparator) provided us with additional documents from Goeldi. We are further indebted to Mme E. Lang, Musée Zoologique de Strasbourg, the Burgerbibliothek Bern and the Staatsarchiv Bern for their assistance with archival investigations. We would also like to thank the curators of the Swiss natural history museums for answering our questionnaire about Goeldi specimens in their collections.

5. Zusammenfassung

In den Jahren 1898–1911 erhielt das Naturhistorische Museum Bern eine grosse Zahl von brasilianischen Tieren, insgesamt rund 14 000 Exemplare. Diese Sammlung war durch den Schweizer Zoologen Emil August Göldi, teils als Privatsammlung, teils als Sammlung des Staatsmuseums in Pará – heute Museu Paraense Emílio Goeldi (MPEG) – zusammengetragen worden. Die Privatsammlung wurde dem Berner Museum nach Göldis Rückkehr in die Schweiz geschenkt; die Sammlung des MPEG wurde als permanentes Depot ausserhalb der Gefahren des tropischen Klimas eingerichtet.

Die Sammlung wurde kürzlich inventarisiert, wobei alle Wirbeltiere und Teile der Insektenbestände in ein Computer-Inventar aufgenommen wurden. Die in Bern heute vorhandenen Typus-Exemplare von Wirbeltieren sind vollständig angegeben. Im weiteren werden die andern Schweizer Museen und Sammlungen aufgelistet, die im Besitz von Göldi-Objekten sind oder waren.

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